NOTES

The candidates for the chair of Geology held by the late Prof. Sedgwick now stand as follows:—Mr. Morris, Lecturer on Geology at University College, London, and a Vice-President of the Geological Society; Mr. P. Martin Duncan, F.R.S., also a Vice-President of the Geological Society, Professor of Geology in King's College, London, and Lecturer at the Indian College of Civil Engineering at Cooper's Hill; the Rev. Osmond Fisher, formerly Fellow and Tutor of Jesus College, Cambridge; the Rev. T. G. Bonney, Fellow and Tutor of St. John's College, Cambridge; Mr. Boyd Dawkins, F.R.S., formerly on the Geological Survey, and now Director of the Museum and Lecturer in Geology at Owens College, Manchester; Mr. A. H. Green, of the Geological Survey, formerly Fellow of Gonvillle and Caius College, and now Lecturer in Geology at the School of Military Engineering at Chatham; and Mr. Hughes, of Trinity College, also on the Geological Survey. Mr. Morris has acted for the last two years as deputy to the late professor.

A Correspondent in Paris informs us that M. Janssen was to be nominated to a vacant place in the French Institute last Monday, and that there is every likelihood of his obtaining a majority of votes when the election takes place a few weeks hence. M. Janssen is to be sent to Pekin in December 1874, for the purpose of observing the transit of Venus.

Probably the first telegram transmitted by the Atlantic cable, under the generous arrangement mentioned in Nature of January 30 last, was received by the Astronomer Royal on February 7, and forwarded to us the same day. It announced the discovery of a new planet, No. 129, of the 10th magnitude, on the night of February 6: R.A. $9^h\ 16^m$ north decl. 15° 38′. Such an excellent arrangement is likely to save all disputes as to priority of discovery.

Prof. Flowers's Hunterian Lectures at the College of Surgeons for this year will treat of the Osteology and Dentition of Extinct Mammalia, with their geological and geographical distribution and relation to existing forms. The course commences on Monday next (the 17th) at four o'clock, and the lectures will be continued at the same hour on Mondays, Wednesdays, and Fridays until March 28. It may not be generally known that this course is open to all who wish to attend, without fee or any formality.

Dr. T. R. Lewis has made the important discovery of a haematozoon, which he has provisionally named *Filaria sanguinis hominis*. In a paper lately published at Calcutta, he describes its discovery last July in the blood of a patient suffering from a disease well known in tropical countries, Chyluria. The worms appear to be present in very large numbers in the blood and in some of the secretions; indeed, they were first observed in the urine two years ago. They are evidently hematoids, but sexual distinctions have not been hitherto observed, nor is anything known of their ova or development, nor how they gain an entrance to the body. Each is inclosed in a hyaline sheath, in which it can contract and expand itself, so that they may be probably regarded as in an encysted form. The average length is ·175 of an inch, the breadth about that of a red blood-disc; they are therefore much smaller than the Guinea-worm or *Trichina spiralis*. The disease of which it is probable that they are the cause is not rare in tropical countries, and is sometimes fatal. This curious "Filaria" was discovered independently in chylous urine, by Dr. Lewis and by Wucherer, in 1870. Dr. Crevaux, of the French navy, published a memoir on the same subject a few months ago ("De l'Hematurie chyleuse ou graisseuse des pays chauds;" A. Delahaye, Paris, 1872). In the Montpellier *Revue des Sciences Naturelles*, for September, 1872, Dr. A. Corre figures and describes some specimens as transparent, colourless, and varying in size from ·2 to ·265 of a millimetre long, by ·006 to ·007 broad at the thickest part. This exactly corresponds with the diameter of a human red blood-disc, as given by Welker. He has sometimes observed a slight constriction below the head, as has Dr. Crevaux, who also noticed the dark spot supposed by Dr. Lewis to be a mouth, "qui ressemble plutôt à un amas de granulations qu'à un orifice." MM. Crevaux and Corre have been unable to distinguish any organs, only granulations forming a central line down the body, "qui simule, au premier aspect, un canal étendu de la tête à la queue." Wucherer regards the worm as probably a larval form. It is important to remark that the cases examined by their authors were all from tropical America. The descriptions and the drawing referred to abundantly confirm Dr. Lewis's admirable observations, though they are not nearly so complete. To him belongs the undivided merit of discovering this parasite in its true *habitat*, the living blood.

The Director of the Observatory of Harvard College purposes to publish a series of astronomical engravings, which shall represent, as nearly as possible, the most interesting objects in the heavens, as they are seen with the powerful instruments of the observatory under his charge. The series will consist of at least thirty pictures, and will embrace the principal planets, moon-craters, sun-spots, solar prominences, nebulæ, and spectra of variable stars. To obtain some assistance towards defraying the expense of printing, as well as to secure for them a more general circulation than can be expected for volumes of annals of an observatory, they will be offered to subscribers at the rate of *2l. 10s.* for the set. The engravings will be delivered from time to time as they are completed, and they will be followed by some pages of notes and explanations. Messrs. Trübner and Co. are instructed to register the names of intending subscribers.

The American Government has established an Observatory at Fort Garry, Manitoba, which is, as nearly as possible, the central spot of the American continent.

Ammonites have been discovered by Dr. Waagen ("Memoirs of the Geological Survey of India, IX.") in a carboniferous formation near Jabi, north of Shabpoor, in the N.E. of the Punjab. The form appears to be allied to some species found in the Whitby lias. The presence of this family in palæozoic rocks is a new and important observation.

South African sportsmen have got a bad name among many people, the increasing scarcity of the various kinds of so-called "big game" being commonly attributed to their exploits. There are those, however, who think otherwise, and believe, as is doubtless the case, that the deeds of an occasional Gordon Cumming, who makes a shooting excursion up the country, had little lasting effect upon its animal and particularly its mammalian life, the decrease in which is mainly caused by the spread of settlements. The University of Cambridge seems to be of the latter opinion, and on Thursday last, by grace of the Senate, authorised the payment, from the Worts' Travelling Bachelors' Fund, of *200l.* to Mr. T. E. Buckley, F.Z.S. and B.A. of Trinity College, who is about to make an expedition into the interior from Natal, for the purpose of forming natural history collections, and especially of obtaining skeletons of the larger animals, with the understanding that specimens be sent to the Museum of the University, accompanied by reports. Mr. Buckley has had much experience as a traveller, having visited some of the wildest parts of Lapland, explored Turkey, and braved the dangers of the Gold Coast: and he has contributed, in conjunction with his fellow-voyagers Captain Elwes and Captain Shelley, to the *Ibis*, good accounts of the ornithology of the two countries last mentioned.

A severe shock of earthquake was felt at Lahore on January 1, at 7.55 A.M. and at Suchin on December 31. The earthquake, which on December 15 was felt at Lehree in Eastern Cachi and Zehri and the Scinde frontier of India, was also felt at Dadur, Suhwan, Shikarpore, and Jacobabad, within British territory.

IN the beginning of January a sharp shock of earthquake was felt in the island of Imbros, opposite the Dardanelles. Several small works were destroyed, and other damage done. This was, perhaps the same as the earthquake felt on January 13 at Gallipoli, and Chanak, Kalehsi (Dardanelles), at about 10.30 A.M. The oscillation was from S. to N. This earthquake was slightly felt at Constantinople, but not at Smyrna.

THE Royal Commission on Scientific Instruction met on Tuesday and Wednesday of the present week.

WE learn, from the *British Medical Journal*, that Dr. Struthers, Professor of Anatomy at Aberdeen, gives free evening lectures on this subject to students of Divinity and Arts, and to all who take an interest in Natural science.

WE have received an "Extract from the Science Directory, revised to November 1872," showing the nature and amount of assistance afforded by and through the Science and Art Department to Instruction in Science. This gives all the information needed both by pupils or teachers who are desirous of qualifying themselves to participate in the various grants, scholarships, exhibitions, prizes, &c., by which Government seeks to encourage scientific education. Since the publication of the last directory, several alterations have been made in the administration of this department. One is that grants are given to encourage the construction of special laboratories in Schools, and collections of apparatus adapted to teaching will be sent on loan to schools under certain conditions. For the year 1873 arrangements will probably be made to enable a certain number of teachers to stay about six weeks in London, to undergo a course of instruction in teaching certain special subjects. Several improvements have also been made in the course of instruction for students who have completed their course at the ordinary Elementary School. These alterations all tend in the direction of greater stringency and thoroughness, and an attempt has been made so to frame the course, as to lay the foundation of a systematic scientific training.

WE with pleasure notice that a new local scientific society has been started at Kensington, under the title of the Kensington Entomological Society. There are now a considerable number of similar societies in the London suburbs, and we hope this one will meet with encouraging success, and produce some work of lasting value. We hope next week to give a paper read to the Society by Mr. A. Murray, 67, Bedford Gardens, Kensington, who, we have no doubt, will be glad to furnish information to anyone desirous of joining the Society.

WE are glad to see one more provincial paper devote some of its space to Science. A copy of the *Leighton Buzzard Observer* sent us devotes a whole column to scientific jottings, selected with considerable judiciousness.

MR. G. ST. CLAIR, in reference to his letter of last week, sends us a letter from the *Manchester Guardian*, of February 5, which says that the writer and two friends were walking down Oxford Street, Manchester, about 10 P.M., when suddenly the place was illuminated with a bluish light equal to the light of mid-day, and right over their heads burst, as it were, a ball of fire; instantly it shot through space, when it burst again, and finally disappeared. After a few seconds more they distinctly heard the sound of a report like thunder. The course of the meteor appeared to them to be from east to west; the time was about seven seconds.

A MEDICAL Society has been formed at Smyrna, on the basis of the Imperial Medical Society at Constantinople.

THE Abbé Moigno, after all, has brought his *Salles du Progrès* to a termination; not, however, we are glad to learn, because his praiseworthy scheme of popular education has turned out a failure, but because he has found another means of accomplishing his "great object of intellectual regeneration by true science, good and beautiful." The founders of the Catholic Circle of Workmen—a scheme apparently meant for the elevation of the French working classes—have proposed to make use of the Abbé's services, his educational staff and *matériel*, to carry out their educational plans both in Paris and in the provinces. He has, we think wisely, accepted the offer, and, although he has been compelled to terminate his own particular scheme, he will be in a much better position for accomplishing the admirable end he has in view.

MR. W. B. GAMLEN, M.A., of Exeter College, has been elected Secretary to the Curators of the Oxford University Chest.

THE following information has been sent us by the scientific editor of *Harper's Weekly*:—Prof. Powell has returned from the exploration of the Colorado River of the West, having completed the examinations of the wonderful series of cañons along the course of this river about October 1 last. He then visited a group of volcanic mountains north of the Grand Cañon, composed of about sixty basaltic cones, to which he has given the name of Uinkaret Mountains (the Indian name, signifying "Where the pines grow"). An extensive series of faults has been examined by the party this year. These run in a northerly and southerly direction across the Grand Cañon, and north into the plateaus at the head of the Sevier, and some as far as the Wasatch Mountains. They are from 50 to 200 miles in length, and the drop from 100 to 3,000 ft. The fissures of these faults have been vents for volcanic eruptions, and along their courses vast floods of lava have been poured out and cones built up. A number more of the ruins of ancient communal houses have been discovered, making in all more than a hundred so far found by the party in the valley of the Colorado. One of these was situated on the crater of a volcanic cone. The collection of picture-writings (etchings on the rocks) has been much enlarged; and the seven ancient towns, called by the Spaniards the Province of Tusayan, have been revisited for ethnological purposes. The professor has also continued his studies of the Ute Indians. He has discovered among them an extensive system of mythology and a great number of rude songs, and brought with him a large collection of articles illustrating the state of the arts among the people who inhabit the valley of the Colorado, composed of stone implements, pottery, basket-ware, clothing, implements for hunting and entrapping animals, musical instruments, ornaments of feathers, bones, teeth, and claws, and various miscellaneous articles. Prof. Thompson remains in the field for the purpose of extending the exploration north, toward the Wasatch Mountains.

AN article by Herr von der Wengen, on the artificial breeding of salmon in Silesia during the season of 1871 and 1872, published in the circular of the *Deutsche Fisherei-Verein*, contains some very interesting facts in reference to this fish. As the result of four successive years of observation, he remarks that he finds salmon generally descend to the sea in the second year, and remain there not one year, as is so generally assumed, but more nearly two, before returning to the river and home of their youth. The establishment at Hammel, which has already done so much to increase the stock of salmon in the Upper Weser, has determined, from numerous observations, that a period of four years elapses between the birth of the salmon and its first return from the ocean.

OSCAR GRIMM describes Bacteria and Vibriones from his own investigations in the *Archiv fur Mikrosc. Anatomie*. He has observed their conjugation and fissiparous multiplication, and also has seen leucocytes breaking up into granular matter which ultimately assumed the form of Bacteria.

PROF. MOLLER, of Lund, Sweden, has published the Ephemerides of Faye's comet for its next return to the neighbourhood of the sun. It will be in perihelion about July 18, and will continue to approach nearer and nearer to the earth till Jan. 10, 1874. It will not, however, be in a position favourable for observation, and it is very probable that not even the most powerful telescope will be able to catch it.

M. CALLAS in *Les Mondes* endeavours to account for a dry haze (*brouillard sec*) which is seen in the atmosphere at certain seasons in particular countries. At Paris he says it is clearly visible on the horizon on the morning of lovely summer days, and is regarded as the presage of fine warm weather. It is of a light roseate hue. In proportion as the day is dry and warm, the denser and higher above the horizon is the haze. This haze is seen at all heights, having been observed by Saussure in Switzerland, by Lecay and Charles Martin in Auvergne, and by Wilkomer in Spain; in all cases, the phenomenon is seen at its best when the day is dry and warm. M. Callas attributes it to the combustion of aerolites and shooting stars. The attraction of the earth, he says, causes these bodies to deviate from their regular course and to be precipitated to the earth's surface with a rapidity which certainly exceeds 20 kilometres per second, and which is sufficient to set them on fire and render them volatile. The vapours thus produced rapidly become so rarified that they may be looked upon as the ultimate limit of divisibility of insoluble bodies and form the dry mists alluded to. Obeying the law of gravity these descend to the earth from the heights where they are formed, slowly however, on account of their extreme tenuity. As they approach the earth they come under the influence of winds which dissipate them, and of cold moisture, which absorbs them. Hence it is that they are perceived only in certain countries and in warm seasons; especially in Spain, and on the table-lands of Abyssinia and Mexico. M. Callas thinks that the haze may be regarded as a sort of cosmical matter akin to that which composes the tails of comets. The hypothesis has the merit of being at least curious, and so far as we know, original.

THE first paper in the last number of the Bulletin of the French Geographical Society is in connection with a well-executed map of the chief physical features of Eastern Brazil, appended to the number. M. Charles Grad contributes a long article on the geology of the Algerian Sahara and its system of waters. Perhaps the most interesting article is by M. Paul Gaffanel on the Great Sargasso Sea in the middle of the Atlantic, the history of which he traces from the Phœnicians downwards, describes its geography historically and with reference to what is known of it at present, which seems to be comparatively little, and concludes by pointing out that the wrack or algæ of which it is composed might be put to immensely profitable industrial uses.

WE have received the prospectus of the new Italian Geographical Magazine, whose first appearance we announced last week. Dr. Petermann has written a very hearty preface for his young friend, the editor, Guido Cora, whose plan is very comprehensive, embracing not only geography proper, but also geognosy, botany, zoology, anthropology, ethnography: hence the name of the magazine,—*Cosmos*. We wish it ample success.

THE *Revue Scientifique* for Feb. 8 contains Dr. Liebreich's Royal Institution lecture on the effect of School Life on Vision in the Young.

SIR W. ARMSTRONG ON THE COAL QUESTION*

II.

AT the present moment attention is being drawn to a new method of increasing the efficiency of the steam engine by pumping heated air into the boiler. It is impossible to conjecture what theoretical considerations could have led Mr. Warsop, the discoverer of the system, to anticipate beneficial results from the adoption of such an expedient, and yet the experiments that have been made in proof of its efficacy are so authoritative that they cannot be repudiated on the ground of their being unsupported by theory. This subject, although much debated of late, is still so ambiguous and obscure that I shall take the present opportunity of stating the difficulties of the case in the hope of eliciting satisfactory explanation. Mr. Warsop's method consists in attaching to a steam engine a forcing pump for the purpose of injecting air into the boiler. The pipe from this forcing pump is formed into a coil in the flue so that the air may absorb a portion of the waste heat. After entering the boiler the pipe is laid along the bottom, and being perforated with holes allows the air to bubble up through the water at many different points. The result appears to be that, with a given expenditure of fuel, the available power of the engine is considerably increased by the action of the air-pump, notwithstanding that the power for working it is derived from the engine itself. How, then, is this to be explained? It is clear that air forced into a receiver cannot without the aid of extraneous heat give back all the power expended upon the forcing pump. There must of necessity be loss of power by friction, and also from the impossibility in practice of realising all the expansive action of the condensed air corresponding to the compressive action of the pump prior to actual injection taking place. It would be a liberal estimate to assume that one-half of the power expended on the pump is recoverable from the air. Hence, to make up the deficiency by the application of heat, we should have to double the volume of the air, which would require it to be heated to upwards of 500° F, above its initial temperature. Now, in the case of the Warsop arrangement, considering the inconsiderable heating power of the escaping gases to which the air-pipe is exposed; considering also the slow absorbing power of air, and the smallness of the surface presented by the coiled pipe, it is hard to believe that the air could enter the boiler at such a temperature as I have named; but even if it did, where is the surplus power to be found that gives the engine a palpable increase of efficiency? The mere reaction of the compressed air, with all the aid it can possibly derive from the absorption of waste heat, would barely save a loss, and certainly could never account for an important gain. It seems obvious, therefore, that whatever beneficial action is exercised by the air must be of an indirect nature, and not the immediate effect of its mechanical energy.

Four modes of action have been put forward to account for the effects obtained. Firstly, it is said that the air, in bubbling through the water, facilitates the disengagement of the steam. This may very possibly be the case, for we know that water, entirely deprived of air, may be heated in an open vessel to a temperature greatly exceeding the usual boiling point, before ebullition commences. The reason of this is, that the adhesion between the water and the containing vessel, and also between the particles of water themselves, is sufficient to restrain the formation of steam at the usual boiling heat, unless air be present to afford points of separation. So far the explanation is plausible; for if the abstraction of air from water raises the boiling point, we may infer that the addition of air will lower it. But the reduction of the boiling-point within any supposable limits, would not lessen the quantity of heat required for the production of the steam sufficiently to afford a solution; because the sum of the latent and sensible heat, though not constant, as was formerly supposed, does not vary in relation to the boiling point to such an extent as would account for any important saving in that direction. A tangible advantage might, however, accrue from the accelerated transmission of heat from the fire to the water, caused by the increase of difference which a lowered boiling point would occasion between the temperature of the water and that of the fire and gases acting on the boiler; but in the absence of thermometric experiments to show how much the boiling point is actually reduced, and how much the escaping gases are cooled, it is impossible to form any definite opinion as to the amount of this saving. It is certain, however, that unless the reductions of temperature be greater

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* Continued from p. 272.